ASSIGNMENT 1

Textbook Assignment: "Engine Systems" and "Power Train" pages 1-1 through 2-7.

Learning Objective: Recognize the principles and components of internal combustion engines.

1–1. An engine is a device that converts what type of energy into mechanical energy to perform work?

1. Reciprocating
2. Physical
3. Heat
4. Kinetic

1–2. What is the name of the chemical reaction that occurs when the air and fuel mixture in a cylinder is ignited?

1. Combustion
2. Explosion
3. Detonation
4. Convulsion

1–3. The connecting rod transmits the up–and–down motion of the cylinder to the crankshaft.

1. True
2. False

1–4. The movement of a piston from top to bottom or from bottom to top is known by what term?

1. The top dead center
2. The bottom dead center
3. The timing
4. A stroke

1–5. What total number of the intake, compression, power, and exhaust series of events must occur to equal a cycle?

1. One
2. Two
3. Three
4. Four

1-6. During the intake stroke, in a four-stroke cycle gasoline engine, what condition is created in the cylinder by the downward movement of the piston?

1. Compression
2. Vacuum
3. Combustion
4. Expansion

1-7. To what volume is the fuel and air mixture compressed in a diesel engine?

1. One eighth
2. One fifteenth
3. One twentieth
4. One twenty-fifth

1-8. In a four-stroke cycle diesel engine, air and fuel are mixed in what component?

1. The combustion chamber
2. The injection system
3. The catalytic converter
4. The carburetor

1-9. The diesel engine develops greater torque than a gasoline engine due to the power developed from the low-compression ratio.

1. True
2. False

1-10. What term is used to describe the system of a two-stroke diesel engine taking in air and discharging exhaust?

1. Supercharging
2. Turbocharging
3. Scavenging
4. Blowing

1–11. If the exhaust valve opened in the middle of the intake stroke, the piston would draw burnt gases into the combustion chamber with a fresh mixture of fuel and air.

1. True
2. False

1-12. What part of the camshaft contacts the bottom of the lifter?

1. Cam bearing
2. Cam valve tappet
3. Cam timing gear
4. Cam lobe

Learning Objective: Recognize the principles and components of fuel systems.

1-13. The function of the fuel system is to ensure a quantity of clean fuel is confined from the fuel intake of an engine?

1. True
2. False

1–14. What type of harmful pollution is emitted in great amounts into the atmosphere by engines that use leaded gasoline?

1. Hydrocarbons
2. Sodium Aluminate
3. Hydrogen sulfide
4. Carbon dioxide

1-15. What number designator is used to identify the ability of gasoline to burn evenly and resist spontaneous combustion?

1. Cetane
2. Ratio
3. Octane
4. Fathom

1-16. As engine exhaust passes through the catalytic converter, what chemical compounds are produced by the oxidation of carbon monoxide and hydrocarbons?

1. Nitrates and ketones
2. Hydrogen sulfide and carbon monoxide
3. Carbon dioxide and water
4. Sulfur dioxide and acetones

1-17. Catalytic converters are designed to convert the exhaust gases formed from the combustion of leaded gasoline.

1. True
2. False

1-18. Diesel fuels can retain dirt particles in suspension longer than gasoline because it is heavier and more viscous.

1. True
2. False

1-19. What supervisor approves the use of Jet-A1 and JP–5 as fuel?

1. Maintenance
2. Transportation
3. Project
4. Light shop

1–20. To prevent injector pumps and injector from seizing when jet fuel is used in diesel engines, what ingredient is added to the jet fuel to improve the lubricating qualities?

1. Hydraulic fluid
2. Engine oil
3. Power steering fluid
4. Drive line oil

1-21. The fuel filter operates by passing fuel through a porous material that blocks particles large enough to cause a problem in the fuel system.

1. True
2. False

1-22. What is the purpose of a primary fuel filter on a diesel fuel system?

1. Filters all foreign matter from the diesel fuel
2. Filters minute traces of foreign matter from the diesel fuel
3. Filters the air deposits from diesel fuel
4. Filters the larger foreign matter from the diesel fuel

1-23. A good practice is to drain one gallon of fuel out of the filter into a container or onto a rag during prestart operations.

1. True
2. False

1-24. What is the primary function of the secondary filter?

1. To protect the carburetor
2. To protect the fuel injection pump
3. To protect the fuel transfer pump
4. To protect the fuel supply lines

1-25. What function of the engine creates a partial vacuum in the carburetor throat that allows low-pressure air to rush by the fuel nozzle?

1. The upward compression stroke of the piston
2. The exhaust stroke driven turbocharger
3. The downward intake stroke of the piston
4. The power stroke of the piston

1-26. The primary function of the injection pump is to supply low-pressure fuel for injection.

1. True
2. False

1-27. What is the basic function of injector nozzles?

1. Forms a restriction that causes more fuel and less air to be injected into the combustion chamber of each cylinder
2. Injects fuel into the float chamber of the carburetor
3. Sprays the fuel in atomized form into the combustion chamber of each cylinder
4. Sprays a rich air-to-fuel mixture in the cylinders for the hard job of starting diesel engines

1-28. Glow plugs and injector nozzles are installed in the precombustion chamber of the cylinder head.

1. True
2. False

Learning Objective: Recognize the principles and components of air induction systems.

1-29. Which of the following is NOT the function of a diesel engine air induction system?

1. Cleans the intake air
2. Silences the intake noise
3. Furnishes air for supercharging
4. Controls the fuel and air mixture

1-30. The power that drives the turbine wheel on a turbocharger is generated by what source?

1. Exhaust gases
2. A hot flame
3. Electrical sparks
4. High-pressure air

1-31. Poor combustion is a result of a buildup of dust and dirt in the air cleaner passages that has choked off the air supply.

1. True
2. False

1-32. What person is responsible for cleaning out the collector bowl of a precleaned?

1. The mechanic
2. The washrack custodian
3. The yard boss
4. The operator

1-33. What two stages are dry-element cleaners built to clean?

1. Dry-cleaning and filtering
2. Precleaning and filtering
3. Wet-cleaning and drying
4. Precleaning and discharging

1-34. Which of the following conditions should be looked for when you inspect a dust unloading valve?

1. Cracks
2. Clogging
3. Deterioration
4. All of the above

1-35. What procedure should you use to clean a dusty air filter element?

1. Apply high-pressure air
2. Apply high-pressure water
3. Tap the filter on the heel of your hand
4. Tap the filter on the tire of a vehicle

1-36. What supervisor must approve the washing of any filter elements with water?

1. Transportation
2. Maintenance
3. Light shop
4. 5000 shop

1-37. What happens to the larger dirt particles that are drawn through an oil bath air cleaner?

1. Remains trapped in the filter element
2. Remains trapped in the dust unloader valve
3. Remains trapped in the oil
4. Remains trapped in the dust cup

Learning Objective: Recognize the principles and components an engine lubrication system.

1-38. Which of the following is NOT a function of the engine lubrication system?

1. Absorbs and dissipates heat
2. Seals the piston rings and cylinder walls
3. Provides lubricant to the fuel and air mixture
4. Cleans and flushes moving parts

1-39. From what component is the heat from the engine oil dissipated?

1. The engine sump
2. The radiator
3. The oil jackets
4. The oil expansion tank

1-40. What type of oil filter element fits into a permanent metal container?

1. Precleaned
2. Cartridge
3. Sealed
4. Oil bath

1-41. In what manner does oil pass through a sealed type of oil filter?

1. The oil enters the top of the filter element and passes through the bottom
2. The oil enters the bottom of the filter element and passes through the top
3. The oil enters the bottom center of the filter element and passes through the outside
4. The oil enters the outside of the filter element and passes through to the center

1-42. What type of oil filtering system does NOT filter the oil before it is sent to the engine?

1. Bypass
2. Full flow
3. Partial flow
4. Alternate pass

1-43. Which of the following is NOT a common type of base for hydraulic fluid?

1. Water
2. Petroleum
3. Lithium
4. Synthetic

1-44. Gear oils break down or foam at high temperatures.

1. True
2. False

1-45. Grease lube charts state locations of grease fittings and how often the fitting should be lubricated.

1. True
2. False

1-46. What person has the responsibility for greasing equipment?

1. Yard boss
2. Operator
3. Company clerk
4. Grease rack custodian

Learning Objective: Recognize the principles and components of engine cooling systems.

1-47. The cooling system assists the engine in warming up to its normal operating temperature.

1. True
2. False

1–48. What material is used extensively on air–cooled engines to help dissipate heat?

1. Titanium
2. Plastic
3. Steel
4. Aluminum

1-49. A pump draws coolant from the bottom of a radiator.

1. True
2. False

1-50. What total number of degrees Fahrenheit per pound of coolant does a radiator pressure cap raise the boiling point of the coolant?

1. 12 degrees
2. 9 degrees
3. 3 degrees
4. 6 degrees

1-51. Which of the following conditions, if any, causes the vacuum valve to open on a radiator pressure cap?

1. The cooling system pressure raises above the outside pressure as the engine cools
2. The cooling system pressure drops below the outside pressure as the engine cools
3. The cooling system pressure raises above the outside pressure as the engine warms up
4. None

1–52. Which of the following is NOT a property of water that limits its usefulness as a coolant?

1. Boiling point
2. Freezing point
3. Natural corrosive action on metal
4. Chlorine content in the water

1–53. In the NCF, what is the rule of thumb for fan belt tension?

1. No more the than 1 inch deflection
2. No more than 3/4 inch deflection
3. No more than 1/2 inch deflection
4. No more than 1/4 inch deflection

1-54. The passages of the water jacket are designed to provide what function?

1. Increase the circulation of the coolant
2. Control the circulation of the coolant
3. Control the temperature of the coolant
4. Decrease the temperature of the coolant

1-55. On a cold engine, what component restricts the circulation of coolant?

1. The shutter
2. The overflow tank
3. The water jacket
4. The thermostat

1-56. What component serves as a receptacle for coolant forced out of the radiator overflow pipe?

1. Expansion tank
2. Augmentation tank
3. Overflow tank
4. Contraction tank

1-57. The expansion tank is mounted in series with the lower radiator hose and is used to supply extra room for coolant expansion.

1. True
2. False

1–58. The cooling action on air-cooled engines is based on what simple principle?

1. The surrounding air is cooler than engine heat
2. The surrounding air is cooler than radiator coolant
3. The surrounding air is easier controlled than radiator coolant
4. The engine heat is easier controlled by use of surrounding air

1-59. What component on the cylinder barrel and head provides more cooling area or surfaces and aids in directing air flow?

1. Fan
2. Shroud
3. Fins
4. Baffles

Learning Objective: Recognize the principles and components of transmissions.

1-60. Power from the engine provides the torque required for the transmission to overcome inertia.

1. True
2. False

1–61. What component engages and disengages the engine crankshaft to or from the transmission?

1. Drive shaft
2. Universal joint
3. Clutch
4. Flywheel

1–62. What component of the disc clutch is secured to the engine flywheel?

1. Clutch driven plate
2. Clutch driving plate
3. Clutch release sleeve
4. Clutch release shoe

1-63. Using the clutch as a foot rest creates light spring pressure, resulting with little friction between the two members of the clutch.

1. True
2. False

1-64. At what location is the transmission located within the power train?

1. Between the propeller shaft and rear axle
2. Between the forward rear axle and trunnion axle
3. Between the flywheel and clutch housing
4. Between the clutch housing and propeller shaft

1-65. What device is added to transmissions to equalize the speed of the mating parts before they engage?

1. A countershaft
2. A synchronizer
3. An equalizer
4. A planetary gearset

1-66. What component of the power train allows the operator to apply engine power to the wheels smoothly and gradually?

1. The gearshift lever
2. The propeller shaft assembly
3. The clutch
4. The accelerator pedal

1-67. On a manual transmission, what action should an operator take when waiting at a long traffic light?

1. Depress the clutch pedal until the light turns green
2. Depress the clutch pedal, shift the transmission to neutral, and continue with the clutch depressed until the light turns green.
3. Depress the clutch pedal, shift the transmission to neutral, and release the clutch pedal
4. Depress the clutch pedal, shift the transmission to first gear and continue with the clutch depressed until the light turns green

1-68. During double-clutch shifting, what technique is performed when shifting to a lower gear but not performed when shifting to higher gear speeds?

1. Engine is accelerated when the transmission is in neutral
2. Clutch pedal is fully depressed twice
3. Accelerator pedal is released before depressing the clutch
4. When the clutch is fully depressed, the gearshift lever is placed in the neutral position

1–69. Which of the following factors does NOT affect the performance of an automatic transmission?

1. Throttle position
2. Vehicle speed
3. Engine temperature
4. Position of the shift control lever

1-70. Which of the following components is NOT a part of a torque converter?

1. Generator
2. Pump
3. Turbine
4. Stator

1–71. What part of a torque converter adds its force to the pump by redirecting the oil as it leaves the turbine?

1. The impeller
2. The torus
3. The stator
4. The driving member

1–72. Besides the planet carrier, the planetary gear system includes the sun gear, ring gear, and what other components?

1. Planet pinions
2. Throw-out bearings
3. Star gears
4. Moon pinions

1-73. What component of the planetary gear system has internal teeth?

1. Planet pinion
2. Sun gear
3. Ring gear
4. Planet carrier

1-74. Which of the following is an advantage of the planetary gear system?

1. More teeth make contact to carry the load
2. Gears are always in mesh
3. Ease of shifting
4. Each of the above

1–75. For power to be transmitted through a planetary gear system, which of the following conditions must exist?

1. Engine must deliver power to one of the three members
2. The propeller shaft must be connected to one member
3. One member must be held stationary
4. All of the above